What is claimed is:

1. A method of applying scatter and attenuation correction to emission tomography images of a region of interest of a subject under observation comprising the steps of:

aligning a three-dimensional computer model representing the density distribution within said region of interest with said emission tomography images; and

applying scatter and attenuation correction to said emission tomography images using said aligned computer model as a guide.

2. The method of claim 1 wherein said computer model is in the form of a two-component atlas.

3. The method of claim 2 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, the anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

4. The method of claim 3 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

5. The method of claim 4 wherein said region of interest is the head and wherein said functional component is the brain component of a head atlas.

6. The method of claim 4 wherein said region of interest is the heart, said functional component of said atlas simulating a cardiac image and said anatomical component of said atlas representing anatomical features of the thorax.

7. The method of claim 6 wherein the anatomical features of the thorax include:

soft-tissues such as the heart, liver, muscle, and fat;

very low-density soft-tissues such as the lungs; and
high-density tissues such as bone and cartilage in the ribs and spine.

8. The method of claim 3 further comprising the step of selecting an atlas from a database of atlases prior to performing said aligning step.

9. The method of claim 8 wherein said selecting step is performed manually.

10. The method of claim 8 wherein said selecting step is performed automatically based on the degree of registration of each atlas in said database with said emission tomography images.

11. The method of claim 10 wherein the degree of registration is determined by:
performing a preliminary reconstruction of each atlas; and
registering the atlas to the preliminary reconstruction.

12. The method of claim 10 further comprising the step of combining multiple atlases to yield a resultant atlas that better registers with said emission tomography images.

13. The method of claim 8 wherein said database includes disease specific atlases, physical trait specific atlases and/or tracer or lesion specific atlases.

14. In an emission tomography imaging system where emission tomography images of a region of interest of a subject are taken for analysis and are corrected for scatter and attenuation, the improvement comprising:
using a three-dimensional computer model approximating the density distribution within the region of interest as a guide to the application of scatter and attenuation correction.

15. The emission tomography imaging system of claim 14 wherein said computer model is in the form of a two-component atlas.

16. The emission tomography imaging system of claim 15 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, the anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

17. The emission tomography imaging system of claim 16 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

18. An emission tomography image processing system comprising:

memory storing emission tomography images of a region of interest of a subject;

said memory also storing at least one three-dimensional computer model of said region of interest, said computer model representing the density distribution within said region of interest; and

a processor for registering said computer model with said emission tomography images and for applying scatter and attenuation correction to said emission tomography images using said registered computer model as a guide.

19. An emission tomography image processing system as defined in claim 18 wherein said at least one computer model is in the form of at least one two-component atlas.

20. An emission tomography image processing system as defined in claim 19 wherein said processor firstly registers a functional component of said atlas with said emission tomography images to generate a set of spatial transformation parameters and then registers the anatomical component of said atlas with said emission tomography images using said set of spatial transformation parameters.

21. An emission tomography image processing system as defined in claim 20 wherein said functional component simulates a SPECT or PET scan of said region of interest

and wherein said anatomical component simulates a transmission scan of said region of interest.

22. An emission tomography image processing system as defined in claim 21 wherein said memory stores a database of atlases.

23. An emission tomography image processing system as defined in claim 22 wherein said processor selects an atlas from said database automatically based on the degree of registration of each atlas in said database with said emission tomography images.

24. An emission tomography image processing system as defined in claim 23 wherein said processor performs a preliminary reconstruction of each atlas and registers the atlas to the preliminary reconstruction to determine the degree of registration of each atlas.

25. An emission tomography image processing system as defined in claim 23 wherein said processor combines multiple atlases to yield a resultant atlas that better registers with said emission tomography images.

26. An emission tomography image processing system as defined in claim 22 wherein said database includes disease specific atlases, physical trait specific atlases and/or tracer or lesion specific atlases.

27. An emission tomography imaging system comprising:

means for taking emission tomography images of a region of interest of a subject to form a three-dimensional image of said region of interest;

memory to store said emission tomography images, said memory also storing at least one three-dimensional computer model of said region of interest, said computer model representing the density distribution within said region of interest; and

a processor for aligning said computer model with said emission tomography images and for applying scatter and attenuation correction to said emission tomography images using said aligned computer model as a guide.

28. A computer readable medium including computer program code for applying scatter and attenuation correction to emission tomography images of a region of interest of a subject, said computer readable medium including:

computer program code for aligning a three-dimensional computer model representing the density distribution within said region of interest with said emission tomography images; and

computer program code for applying scatter and attenuation corrections to said emission tomography images using said aligned computer model as a guide.

29. A computer readable medium as defined in claim 28 wherein said computer program code for aligning includes:

computer program code for aligning a functional component of said computer model simulating a SPECT or PET scan of said region of interest and for generating a set of spatial transformation parameters; and

computer program code for aligning an anatomical component of said computer model simulating a transmission scan of said region of interest using said set of spatial transformation parameters.